

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An electrochemical deposition chamber for depositing material onto microfeature workpieces, the chamber comprising:

a processing unit including a first flow system configured to convey a flow of a first processing fluid to a microfeature workpiece at a processing site;

a barrier unit detachably mounted to the processing unit such that the barrier unit is below the processing unit;

an electrode unit releasably coupled to the barrier unit such that the electrode unit is below the barrier unit and spaced apart from the processing unit, the electrode unit including an electrode compartment and a second flow system separate from the first flow system, the second flow system being configured to convey a flow of a second processing fluid through the electrode compartment;

a plurality of independent electrodes in the electrode compartment; and

a barrier between the processing unit and the electrode at the barrier unit to inhibit selected matter from passing between the first and second processing fluids.

2. (Original) The chamber of claim 1 wherein:

the electrodes comprise a first electrode and a second electrode; and

the electrode unit further comprises a dielectric divider between the first electrode and the second electrode.

3. (Original) The chamber of claim 1 wherein:

the electrodes comprise a first electrode and a second electrode arranged concentrically with the first electrode; and

the processing unit further comprises a field shaping module, the field shaping module being composed of a dielectric material and having a first opening facing a first section of the processing site through which ions influenced by

the first electrode can pass and a second opening facing a second section of the processing site through which ions influenced by the second electrode can pass.

4. (Original) The chamber of claim 1 wherein the barrier is a nonporous barrier that prevents nonionic species from passing between the first and second processing fluids.

5. (Original) The chamber of claim 1 wherein the barrier is a semipermeable barrier that allows either cations or anions to pass through the barrier between the first and second processing fluids.

6. (Original) The chamber of claim 1 wherein the barrier is a semipermeable barrier that separates the flow of the first processing fluid from the flow of the second processing fluid.

7. (Withdrawn) The chamber of claim 1 wherein the barrier is a permeable barrier that permits fluid flow between the first and second processing fluids.

8. (Original) The chamber of claim 1 wherein the barrier allows electrical current to pass therethrough in the presence of an electrolyte.

9. (Original) The chamber of claim 1 wherein:
the electrodes selectively induce corresponding electrical fields; and
the processing unit further comprises a field shaping module that shapes the electrical fields induced by the electrodes.

10. (Original) The chamber of claim 1 wherein:
the electrodes comprise a first electrode and a second electrode; and

the electrode unit further comprises a first electrical connector coupled to the first electrode and a second electrical connector coupled to the second electrode, the first and second electrodes being operable independently of each other.

11. (Original) The chamber of claim 1, further comprising:

the first processing fluid, wherein the first processing fluid has a concentration of between approximately 10 g/l and approximately 200 g/l of acid; and
the second processing fluid, wherein the second processing fluid has a concentration of between approximately 0.1 g/l and approximately 200 g/l of acid.

12. (Original) The chamber of claim 11 wherein the second processing fluid has a concentration of between approximately 0.1 g/l and approximately 1.0 g/l of acid.

13. (Original) The chamber of claim 1, further comprising:

the first processing fluid, wherein the first processing fluid has a first concentration of acid; and
the second processing fluid, wherein the second processing fluid has a second concentration of acid, the ratio of the first concentration to the second concentration being between approximately 1:1 and approximately 20,000:1.

14. (Original) The chamber of claim 1 wherein the barrier is canted relative to the processing unit to vent gas from the second processing fluid.

15. (Original) The chamber of claim 1, further comprising a barrier unit coupled to the processing and electrode units, the barrier unit including the barrier.

16. (Original) The chamber of claim 1 wherein:

the barrier includes a first side and a second side opposite the first side;

the first flow system is configured to flow the first processing fluid at least proximate to the first side of the barrier; and
the second flow system is configured to flow the second processing fluid at least proximate to the second side of the barrier.

17. (Original) The chamber of claim 1 wherein the electrodes comprise a pure copper electrode.

18. (Original) The chamber of claim 1 wherein the electrodes comprise a copper-phosphorous electrode.

19. (Currently Amended) An electrochemical deposition chamber for depositing material onto microfeature workpieces, the chamber comprising:

a head assembly including a workpiece holder configured to position a microfeature workpiece at a processing site and a plurality of electrical contacts arranged to provide electrical current to a layer on the workpiece; and

a vessel including (a) a processing unit for carrying one of a catholyte and an anolyte proximate to the workpiece, (b) an electrode unit having an upper portion canted relative to the processing unit ~~having a plurality of electrodes~~ and being configured to carry the other of the catholyte and the anolyte at least proximate to the electrodes, wherein the electrode unit has a plurality of electrodes, and (c) a barrier between the processing unit and the electrode unit to separate the catholyte and the anolyte, and the barrier being canted along the upper portion of the electrode unit.

20. (Original) The chamber of claim 19 wherein the barrier is a semipermeable barrier that allows either cations or anions to pass through the barrier between the first and second processing fluids.

21. (Withdrawn) The chamber of claim 19 wherein the barrier is a permeable barrier that permits fluid flow between the catholyte and the anolyte.

22. (Original) The chamber of claim 19 wherein the barrier is a nonporous barrier that separates a flow of the catholyte and a flow of the anolyte.

23. (Original) The chamber of claim 19 wherein:
the electrodes comprise a first electrode and a second electrode; and
the electrode unit further comprises a dielectric divider between the first electrode and the second electrode.

24. (Currently Amended) A tool for wet chemical processing of microfeature workpieces, the tool comprising:

a processing unit for conveying a first processing fluid to a microfeature workpiece;
an electrode unit including a plurality of electrodes and being positioned below the processing unit;

a barrier unit mounted to a lower portion of~~between~~ the processing and an upper portion of the electrode unit~~unit~~, the barrier unit including a barrier, and the barrier unit being releasably attached to the electrode unit by a quick-release mechanism having a latch;

a first flow system for carrying the first processing fluid, the first flow system including a first portion in the processing unit and a second portion in the barrier unit in fluid communication with the first portion in the processing unit;
and

a second flow system for carrying a second processing fluid at least proximate to the electrodes, the second flow system including a first portion in the electrode unit and a second portion in the barrier unit in fluid communication with the first portion in the electrode unit, wherein the barrier is between the

first processing fluid in the first flow system and the second processing fluid in the second flow system.

25. (Currently Amended) A ~~chamber~~system for wet chemical processing of microfeature workpieces, the chamber comprising:

- a first processing fluid having a concentration of between approximately 10 g/l and approximately 200 g/l of acid;
- a processing unit carrying the first processing fluid and being configured to convey the first processing fluid to a microfeature workpiece;
- a second processing fluid having a concentration of between approximately 0.1 g/l and approximately 1.0 g/l of acid;
- an electrode unit carrying a plurality of electrodes and the second processing fluid proximate to the electrodes; and
- a barrier between the processing unit and the electrode unit to separate the first and second processing fluids.

26. (Currently Amended) The ~~system~~chamber of claim 25 wherein the first and second processing fluids each have a concentration of between approximately 10 g/l and approximately 50 g/l of copper.

27. (Currently Amended) The ~~system~~chamber of claim 25 wherein the barrier is a nonporous barrier that separates a flow of the first processing fluid from a flow of the second processing fluid.

28. (Currently Amended) The ~~system~~chamber of claim 25 wherein the barrier is a porous barrier that permits fluid flow between the first and second processing fluids while preventing organic additives from passing through the barrier.

29. (Currently Amended) A system ~~chamber~~ for wet chemical processing of microfeature workpieces, the chamber comprising:

- a first processing fluid having a first concentration of acid;
- a processing unit carrying the first processing fluid and being configured to convey the first processing fluid to a microfeature workpiece;
- a second processing fluid having a second concentration of acid, the ratio of the first concentration to the second concentration being between approximately 10:1 and approximately 20,000:1;
- an electrode unit carrying a plurality of electrodes and the second processing fluid proximate to the electrodes; and
- a barrier between the processing unit and the electrode unit to inhibit organic additives from passing between the first and second processing fluids.

30. (Currently Amended) The system ~~chamber~~ of claim 29 wherein the barrier is a nonporous barrier that separates a flow of the first processing fluid from a flow of the second processing fluid.

31. (Withdrawn) The chamber of claim 29 wherein the barrier is a porous barrier that permits fluid flow between the first and second processing fluids.

32. (Currently Amended) The system ~~chamber~~ of claim 29 wherein the first and second processing fluids each have a concentration of between approximately 10 g/l and approximately 50 g/l of copper.

33. (Original) A system for wet chemical processing of microfeature workpieces, the system comprising:

- a processing unit for conveying a first electrolyte to a microfeature workpiece;

- a first reservoir in fluid communication with the processing unit, the first reservoir and the processing unit being configured to carry a first volume of the first electrolyte;
- an electrode unit for carrying a second electrolyte and a plurality of electrodes proximate to the second electrolyte;
- a second reservoir in fluid communication with the electrode unit, the second reservoir and the electrode unit being configured to carry a second volume of the second electrolyte, the first volume of the first electrolyte being at least twice the second volume of the second electrolyte; and
- a barrier between the processing unit and the electrode unit to divide the second electrolyte and the first electrolyte.

34. (Original) The system of claim 33 wherein the ratio of the first volume of the first electrolyte to the second volume of the second electrolyte is between approximately 1.5:1 and approximately 10:1.

35. (Original) The system of claim 33, further comprising:
- the first electrolyte, wherein the first electrolyte has a concentration of between approximately 10 g/l and approximately 200 g/l of acid; and
 - the second electrolyte, wherein the second electrolyte has a concentration of between approximately 0.1 g/l and approximately 1.0 g/l of acid.

36. (Original) The system of claim 33, further comprising:
- the first electrolyte, wherein the first electrolyte has a concentration of between approximately 10 g/l and approximately 50 g/l of copper; and
 - the second electrolyte, wherein the second electrolyte has a concentration of between approximately 10 g/l and approximately 50 g/l of copper.

37-52. (Cancelled)